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Structural studies of proteins from the RecFOR pathway involved in DNA repair by homologous recombination

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Maintenance of genomic integrity is extremely important for all organisms. Thus, all cells are equipped with DNA repair mechanisms for different types of DNA damage. The function of the *recFOR* pathway of recombination is currently not well understood. In *E.coli*, the *recFOR* pathway contributes only 0.1-1% of the recombinational activity in the cell (Horii & Clark, 1973) and *recF* and *recR* mutants have relatively subtle phenotypes with regard to recombination. Their UV sensitivity is, however, greatly increased. Studies by Courcelle et al. (1997) suggested that *recF* and *recR* are required for the resumption of replication at stalled DNA replication forks. Hence, the primary function of proteins in the *recFOR* pathway in *E.coli* may not be recombination, but resumption of DNA replication from existing replication forks. In order to get a better understanding of the structure and function of the proteins constituting the RecFOR pathway, we have purified RecF, RecO, and RecR, and crystallized several of them. The goal is to determine the structure of the proteins alone and/or in complex with each other and with DNA. Currently, diffraction data of RecO crystals with and without bound oligonucleotide have been collected to 2.5 Å and 2.8 Å respectively. Crystals of RecR have been grown but need further improvement. Biochemical experiments provide functional data to determine the partners in complex formation and DNA binding activity of the various complexes.

Horii, Z. & Clark, A.J. (1973). *J. Mol. Biol.* **80**, 327-344.

Courcelle, J., Carswell-Crumpton, C., Hanawalt, P.C. (1997). *Proc. Natl. Acad. Sci. USA* **94**: 3714-3719.